JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
A								
Acetaldehyde	CH_3CHO			+	+		1	EP 'O' rings. Special cocks required in TFOW filters at higher concs. CI TFOV could be considered
Acetic Acid	CH_3COOH				+		2	PFA encapsulated 'O' rings (or EP for conc's < 25% & < 50°C). Special cocks in Dual filters. Also see Vinegar.
Acetic Anhydride	$(CH_3CO)_2O$				+		1(50)	EP 'O' rings.
Acetone	CH_3COCH_3	+	+	+	+	+	1	EP 'O' rings. Some pitting on steel might be experienced at elevated temperatures.
Acrylic resin							2	See methyl methacrylate
Acrylonitrile	$H_2C:CHCN$	+		+	+		1	PTFE encapsulated 'O' rings. Pitting of the body material may be experienced at elevated temperatures.
Air		+		+	+	+	G2	Not Dual filters. Scf with caution.
Alcohols		+	+	+	+	+	(1)	Viton & EP 'O' seals may be attacked - see specific alcohol type for more information. See Note 1 & 2.
Alkylates				+	+		(1)	Viton 'O' rings
Alums							2	See aluminium sulphate.
Aluminium Sulphate	$Al_2(SO_4)_3$				+		2	TFOV filters only.
Amines		+		+	+		2	EP 'O' rings. TFOV filters only. Detail composition should be sought.
Ammonia, Anhydrous	NH_3	+		+	+		G1	EP 'O' rings. Do not use TFOW filters. (Liquifiable gas)
Ammonium Bicarbonate	NH_4HCO_3			+	+		2	Viton or EP seals. See notes 1 & 2.
Ammonium Chloride	NH_4Cl				+		2	Nothing suitable over 10% concentration or at high temperature. TFOV or Y-Type only. Nitrile or EP seals.
								Metal mesh (& to a lesser extent perf) elements will be attacked. Monel baskets preferred
Ammonium Diphosphate	$(NH_4)_2HPO_4$				+		2	Could consider CI for TFOV or Y-Type only. Nitrile or EP seals. Special cocks in dual filters.
Ammonium Hydroxide	NH_4OH	+		+	+		2	EP 'O' rings. CI & CS for TFOV filters only. Use special cocks in SS filters especially for high concentrations
Ammonium Monophosphate	$NH_4H_2PO_4$				+		2	Could consider CI for TFOV or Y-Type only. Nitrile or EP seals. Special cocks in dual filters.
Ammonium Nitrate	NH_4NO_3				+		(1)	Special cocks required in TFOW filters. Nitrile or EP seals. CI or Viton could be used at low concentrations.
Ammonia solution								See Ammonium hydroxide
Ammonium Sulphate	$(NH_4)_2SO_4$				+		2	Do not use Dual filters or Viton 'O' seals. CI or CS could be used at low concentrations & temperatures.
								All materials will suffer corrosive attack at high concentrations or temperatures.
Ammonium Sulphite	$(NH_4)_2SO_3$				+		2	Do not use Dual filters or Viton 'O' seals. Could use CI or CS at low concentrations.
Amyl Acetate	$CH_3COOC_5H_{11}$				+		1	EP 'O' rings.
Amyl Alcohol	$C_5H_{11}OH$				+	+	(1)	CS &CI (including WB) could be considered but some attack maybe experienced. EP 'O' seals.
Amyl Chloride (Mixed)	$[C_5H_{11}Cl]$				+		1	CS or CI can be considered. Pitting may occur on SS if amyl chloride is 'raw'. Cautious use of dual filters.
Aniline	$C_6H_5NH_2$				+		1	PFA encapsulated 'O' rings (or EP if some deterioration can be accepted)
Animal Fats		+		+	+		2	SS usually preferred. Heating jackets usually required. GM (& WB) could be used.
Anti freeze								"Anti freeze" is a non-specific term! Car and many 'common' anti freezes are usually ethylene glycol.
Aqua fortis								See Nitric acid
Aqua regia							1	No standard TopFilter filters are suitable.
Arsenic Acid	H_3AsO_4				+		1	See Notes 1 & 2. Special cocks in dual filters.
Asphalt		+	+	+	+	+	2	Viton 'O' seals. Heating jacket probably required.
Aviation Gasoline		+	+	+	+	+	1	Spark ignition aircraft engines - also see 'Jet fuel' for turbine engines. SS or CS usually preferred.
								MTBE 'anti-knock' additive may attack 'O' seals - use special grade Viton or PFA encapsulated if necessary.

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
B								
Baking Soda							2	See sodium bicarbonate or potassium bicarbonate
Bentonite slurries		+	+	+	+	+	2	See notes 1 & 2. Thixotropic properties may cause DP problems on start-up.
Barium chloride	$BaCl_2$				+		1	Some pitting may be experienced. Cautious use of dual filters which must have special cocks.
Barium Hydroxide	$Ba(OH)_2$				+		1	GM filters or WB dual filters could be used with caution. SS dual filters require special cocks.
Barium Sulphide	BaS				+		1	Use special cocks in dual filters. Some erosion may occur at high temperatures.
Beer		+	+	+	+	+	2	SS usually preferred. See notes 1 & 2. Check sterilisation requirements.
Beet Sugar Liquid								See 'Sugar liquids'
Benzene (Benzol)	C_6H_6	+	+	+	+	+	1	Viton 'O' rings
Benzaldehyde	C_6H_5CHO	+	+	+	+	+	1	EP 'O' rings. Special cocks required in SS TFOW filters.
Benzoic Acid	C_6H_5COOH				+		1	Viton 'O' rings. Dual filters not recommended. Some pitting of SS may be experienced at high temperatures
Bitumen		+	+	+	+	+	2	Viton 'O' seals. Heating jacket probably required.
Black Liquor					+		2	Viton 'O' rings
Borax	$Na_2B_4O_7$				+		(1)	EP or Viton 'O' seals. Other materials may be used especially at low concentrations and temperatures.
								See notes 1 & 2.
Boric Acid	H_3BO_3				+	+	(1)	TFOV & Y- Type filters only (some deterioration may occur)
Brandy					+		2	
Brines	NaCl(aq)	+	+	+	+	+	2	See "water sea" for low concentration brines. Corrosion will occur on CI, WB & CS especially at high conc.
Bunker fuel (or oil)								See Fuel oil
Butadiene	$H_2C:CHHC:CH_2$	+		+	+		G1	Viton 'O' rings. CI and CS for TFOV; Y-Type or scf only.
Butane	$CH_3CH_2CH_2CH_3$	+		+	+	+	G1	TFOV & Y- Type filters only. (Liquifiable gas)
Butyl Alcohol	$CH_3(CH_2)_2CH_2OH$				+		1	CI, CS or GM could be used, but some deterioration may occur under exceptional circumstances.
Butyric Acid	$CH_3CH_2CH_2COOH$				+	+	2	EP or Viton 'O' rings. Do not use dual filters. Some deterioration maybe expected at high temperature
C								
Calcium Bisulphite	$Ca(HSO_3)_2$				+		1	Cautious use of dual filters.
Calcium Carbonate slurry	$CaCO_3$ (+ water)	+	+	+	+	+	2	See notes 1 & 2. Note the propensity of calcium carbonate to sedimentation.
Calcium Chloride	$CaCl_2$				+		2	Nothing suitable at high concentration/high temp. Special cocks in TFOW filters. GM OK at low concentration
								CI, CS or WB could be used at low concentrations, but some corrosion will occur. See notes 1 & 2.
Calcium Hydroxide	$Ca(OH)_2$	+			+		2	See Note 1 & 2. Do not use dual filters. Possibility of solids settling under certain circumstances.
Calcium Sulphate	$CaSO_4$	+	+	+	+	+	2	See Note 1 & 2. Precipitation of the solids within the filter may be experienced.
Calgon	$Na_2O:P_2O_5$				+		2	Use special cocks in Dual filters.
Carbolic Acid								See Phenol
Carbon Dioxide	CO_2	+		+	+	+	G2	TFOV or Y-type only.
Carbon Disulphide	CS_2	+		+	+		1	Viton 'O' rings.
Carbon Tetrachloride	CCl_4	+	+	+	+	+	1	Viton 'O' seals. If contaminated with water, may attack any metal, especially at elevated temperatures.
Carbonated Water					+		2	Also see 'water' & carbonic acid. (Other materials could be used but SS usually preferred. See notes 1 & 2)
Carbonic Acid	H_2CO_3	+	+	+	+	+	2	See notes 1 & 2. Also see carbonated water.

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX®
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
Castor Oil		+	+	+	+	+	2	Stainless steel usually preferred
Caustic Potash	KOH						2	See Potassium hydroxide
Caustic Soda	NaOH						2	See Sodium hydroxide
China Clay								See Clay slurries
China Wood Oil (Tung)					+		2	
Chlorobenzene	C_6H_5Cl	+	+	+	+	+	2	Viton 'O' seals
Chloroethane								See Ethyl Chloride
Chloroform	$CHCl_3$	+	+	+	+	+	1	Viton 'O' rings. Stainless steel usually preferred.
Chlorinated water					+		2	Viton 'O' seals. TFOV or Y-Type only. Some attack may be expected on SS at high concentrations/temps.
								CI could be considered at low concentrations/temperatures. See note 2. Also see 'Water - fresh'.
Chocolate		+	+	+	+	+	2	SS usually preferred. Heating jacket usually required. Rotor blade scf ideal. Dual filters non-preferred.
Chromic Acid	H_2CrO_4				+		1	Do not use TFOW filters. SS only for concentrations <10% and <50°C
Chromium trioxide								See Chromic acid
Citric Acid					+		2	Special cocks required in TFOW filters. See notes 1 & 2. Attack may occur above 50°C.
Clay slurries		+	+	+	+	+	2	See notes 1 & 2. The slurry may have thixotropic properties.
Coal Tar		+		+	+		2	Viton 'O' rings. Cautious use of CI or CS if sulphur is present. (NACE MR 0175 may be applied)
Coconut Oil					+	+	2	
Coffee					+		2	SS usually preferred (foodstuff) but other materials could be used. Check sterilisation requirements.
Condensate (Water)		+	+	+	+	+	2	See Water - Fresh
Copper Nitrate	$Cu(NO_3)_2$				+		2	See notes 1 & 2.
Copper Sulphate	$CuSO_4$				+		(1)	See notes 1 & 2.
Cotton seed oil					+	+	2	
Creosote		+	+	+	+	+	1	
Cresylic Acid & Cresol					+		2	Viton 'O' rings
Cutting Oils - water emulsions		+	+	+	+	+	2	See Note 1 & 2.
Cyclohexane	C_6H_{12}	+	+	+	+	+	1	
D								
Demineralised Water	H_2O				+	+	2	See 'water - distilled' (Other materials can be used but see notes 1 & 2)
Detergents		+	+	+	+	+	2	See Note 1 & 2. Some aggressive detergents may have a long term effect on SS or GM.
Diacetone alcohol	$CH_3COCH_2C(CH_3)_2OH$	+	+	+	+	+	1	EP 'O' rings. See notes 1 & 2 if 'wet'.
Dichloroethane								See ethylene dichloride
Diesel Oil (Fuel oil No 2)		+	+	+	+	+	1(40)	Viton generally better than nitrile especially in acidic oils. Do not use EP.
Diethyl ketone	$C_2H_5COC_2H_5$	+	+	+	+	+	1	EP 'O' seals
Diisocyanate								See Isocyanate
Dimethylbenzene								See Xylene
Dimethyl Formamide (DMF)	$HCON(CH_3)_2$				+		1	Encapsulated 'O' seals. (EP or V could be used with some swelling)
Dowtherm		+		+	+		(1)	EP 'O' rings for 209, Viton for A & E

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
Dry Cleaning Fluid		+	+	+	+	+	1	Usually Viton 'O' rings - check actual cleaning chemicals.. SS usually preferred
Dutch oil								See ethylene dichloride
E								
Ethanol								See ethyl alcohol.
Ethers		+	+	+	+	+	1	PFA encapsulated 'O' rings.
Ethyl Acetate	$CH_3COOC_2H_5$	+	+	+	+	+	1	PFA encapsulated 'O' seals. (EP could be used with some swelling)
Ethyl alcohol	C_2H_5OH	+	+	+	+	+	1	EP or nitrile 'O' seals. Do not use CI or CS dual filters if water is present in solution. (See notes 1 & 2)
Ethyl Chloride	C_2H_5Cl				+		G1	Corrosion may be expected with 'wet' ethyl chloride. Do not use TFOW filters.
Ethylene chloride								See ethylene dichloride
Ethylene Dichloride	$ClCH_2CH_2Cl$				+		1	Viton 'O' rings.
Ethylene Glycol	CH_2OHCH_2OH	+	+	+	+	+	(1)	TFOWSS filters need special cocks. Cautious use with CS & CI - readily absorbs water! See notes 1 & 2.
Ethylene Oxide	CH_2CH_2O				+	+	G1	PFA encapsulated seals. CI & CS filters could be used with caution. Dual filters not recommended.
F								
Fatty Acids	$CH_3(CH_2)_xCOOH$				+		2	Viton seals.
Ferric Sulphate	$Fe_2(SO_4)_3$				+		2	Special cocks required in TFOW filters. See notes 1 & 2.
Ferrous Sulphate	$Fe(SO_4)_3$				+		2	Special cocks required in TFOW filters. See notes 1 & 2.
Fish Oils & Fish liver oil		+	+	+	+	+	2	SS generally preferred.
Fluoboric Acid	HBF_4				+		1	Dual filters not recommended (and special cocks required). Fine elements may deteriorate quickly.
Fluosilicic Acid	H_2SiF_6				+		1	Nitrile 'O' rings. Dual filters not recommended. Elements may deteriorate quickly.
Formaldehyde (Formalin)	HCHO				+	+	(G)(1)	CI, CS & WB could be used with caution. See notes 1 & 2. EP 'O' rings
Formic Acid	HCOOH				+		(1)	EP 'O' rings. Some pitting may occur. Dual filters not recommended.
Freon		+	+	+	+	+	2	Generally all metals are OK with dry freons. Check 'O' seal material with specific grade of Freon.
Fruit Juices					+	+	2	SS usually preferred. Check sterilisation requirements.
Fuel Oil		+	+	+	+	+	1	Viton generally better than nitrile, especially in acidic fuels. Do not use EP. Hydrogen stress cracking possible in steel with poorly refined fuels. (See NACE MR 0175)
Fullers Earth							2	See clay slurries
Furfural	C_4H_3OCHO	+	+	+	+	+	1(60)	EP 'O' rings. Seek advice from your Supplier if above 100°C
Fusel oil								See amyl alcohol
G								
Gallic Acid	$C_6H_2(OH)_3CO_2H$				+		2	Viton 'O' seals. Pitting may occur. Dual filters not recommended. Elements may deteriorate quickly.
Gas (General)		+		+	+	+		TFOV or Y-Type only. Please discuss application with your Supplier.
Gas (Combustible)		+	+	+	+	+	G1	TFOV or Y-Type only. Please discuss application with your Supplier.
Gas oil		+	+	+	+	+	1(65)	See fuel oil
Gasoline, Refined		+	+	+	+	+	1	Viton preferred. MTBE / ETBE 'anti-knock' additive may attack 'O' seals - use special grade Viton or PFA encapsulated 'O' seals if necessary.
Gelatine		+	+	+	+	+	2	See Notes 1 & 2. Stainless steel usually preferred for food grade gelatine.
Glucose	$C_6H_{12}O_6$	+	+	+	+	+	2	See Notes 1 & 2. Also see sugar liquids.

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX®
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
Glycerine or Glycerol	$C_3H_5(OH)_3$	+	+	+	+	+	2	See Notes 1 & 2. Stainless steel usually preferred for food grades.
Glycols		+	+	+	+	+	(1)	See ethylene glycol & glycerol. See notes 1 & 2.
Grahams salts								See sodium metaphosphate
H								
Heptane	$CH_3(CH_2)_5CH_3$	+	+	+	+	+	1	
Hexane	$CH_3(CH_2)_4CH_3$	+	+	+	+	+	1	Viton 'O' seals.
Honey		+	+	+	+	+	2	SS usually preferred. See notes 1 & 2.
Hydrocarbons							(1)	Non-specific term. See Paraffin; Gasoline; Oils (mineral); Naphtha; Benzene; Kerosene.
Hydrochloric Acid	HCl						(1)	No standard Airpel products (CI or SS OV filters could be considered at circa 1% - use viton 'O' seals)
Hydrocyanic Acid	HCN				+		1	Special cocks required in Dual filters.
Hydrogen cyanide								See hydrocyanic acid
Hydrofluoric Acid	HF(aq)						1	No standard Airpel products compatible.
Hydrofluorosilicic Acid								See fluosilicic acid
Hydrogen Peroxide	H_2O_2				+		(1)	Attack on SS may be experienced at low liquid concentrations or high temperatures. Use special cocks in TFOW filters. Do not use anerobic adheshives in conc solutions. Do not use copper based alloys.
I								
Isobutane	$(CH_3)_2CHCH_3$	+	+	+	+	+	G1	
Isocyanate		+		+	+		2	Viton 'O' rings
Isopropanol								See Isopropyl alcohol
Isopropyl alcohol (IPA)	$(CH_3)_2CHOH$	+	+	+	+	+	(1)	Viton or EP seals.
J								
Jet A1 DERD 2494		+		+	+		1	Viton. No brass. SS or CS usually preferred.
JP 4, 5, 6, 8 & X		+	+	+	+	+	1	Nitrile 'O' rings (Viton also satisfactory except for JPX) SS or CS usually preferred.
K								
Kaolin								See clay slurries
Kerosene		+	+	+	+	+	1(37)	
Ketchup					+		2	CS or CI could be used, but not normally acceptable for food products. See notes 1 & 2.
Ketones		+	+	+	+	+	1	Generally EP 'O' rings (but in exceptional circumstances PTFE may be required)
L								
Lactic Acid	$CH_3CHOHCOOH$				+		2	Special cocks required in dual filters. Pitting may occur at high temperatures. Elements may deteriorate!
Lager								See Beer.
Lead Acetate	$Pb(C_2H_3O_2)_2$				+		(1)	EP 'O' seals. Special cocks required in Dual filters.
Lime Slurries (Lime water)								See Calcium hydroxide
Lime Sulphur					+		(1)	EP 'O' rings.
Linoleic Acid					+		2	Nitrile or Viton 'O' seals could be used with some swelling, otherwise use encapsulated seals.
Linseed Oil (Raw)		+	+	+	+	+	2	
Lithium Chloride or Bromide	LiCl or LiBr				+		2	Stainless steel single or Y-type filters could be used but some deterioration can be expected especially at

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX®
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
								high concentrations & temperatures. Monel elements preferred. Viton 'O' seals.
Liquefied Petroleum gas LPG		+		+	+	+	G1	TFOV & Y-Type filters only. (Liquefied gas)
Lye							2	See potassium hydroxide or/and sodium hydroxide.
M								
Magnesium Chloride	$MgCl_2$				+		(1)	Nothing suitable at high concentrations/high temperatures.
Magnesium Hydroxide	$Mg(OH)_2$	+	+	+	+	+	2	Viton or EP 'O' rings. See Note 1 & 2. Stainless steel usually preferred.
Magnesium Sulphate	$MgSO_4$	+	+	+	+	+	2	See Note 1 & 2. Special cocks recommended in Dual filters.
Maleic Acid	HOOCCH:CHCOOH	+			+	+	1	See notes 1 & 2. Viton 'O' seals. Dual filters not recommended.
Malic Acid	$COOHCH_2CH(OH)COOH$				+		2	See notes 1 & 2. Dual filters not recommended.
Malt Beverages					+		2	Could use WB or GM but SS usually preferred. Check sterilisation requirements!
Manganese Sulphate	$MnSO_4$	+	+		+	+	2	See note 1 & 2.
Mayonnaise					+		2	Could use other materials, but SS usually preferred (foodstuff). Check sterilisation requirements!
MEA (Monoethanolamine)	$HOCH_2CH_2NH_2$	+	+		+	+	2	Encapsulated 'O' seals. Stainless steel usually preferred.
Methanol								See Methyl alcohol
Methyl Alcohol (Methanol)	CH3OH	+	+	+	+	+	1	EP or Nitrile 'O' rings
Methyl Cellosolve					+	+	2	Encapsulated 'O' seals (Viton or nitrile could be used with some deterioration)
Methyl Chloride	CH_3Cl	+	+	+	+	+	1	Viton 'O' rings. Corrosion will occur if fluid is 'wet'. Cautious use of Dual filters. Use no zinc or aluminium.
Methylated Spirit		+	+	+	+	+		Nitrile or EP 'O' rings.
Methyl Ethyl Ketone (MEK)	$CH_3COCH_2CH_3$	+	+	+	+	+	1	EP 'O' rings
Methyl Isobutyl Ketone	$(CH_3)_2CHCH_2COCH_3$	+		+	+		1	PFA encapsulated 'O' seals.
Methyl Methacrylate	CH_2:$C(CH_3)COOCH_3$				+		1	PFA encapsulated 'O' rings. Special cocks in Dual filters
Milk					+		2	Could use WB or GM (or CI or CS for TFOV or scf) but SS preferred. Check sterilisation requirements!
Mineral Waters					+		2	Other materials could be used but unlikely to be acceptable. See notes 1 & 2.
Molasses		+	+	+	+	+	2	SS preferred. See Note 1 & 2.
Monochlorabenzene	C_6H_5Cl							See Chlorobenzene
MTBE	$(CH_3)_3COCH_3$	+		+	+		1	PFA encapsulated seals
N								
Naphtha		+		+	+		1	Viton 'O' rings. Cautious use of CI & CS if sulphur is present. WB & GM could be used on some grades.
Naphthalene	$C_{10}H_8$	+	+	+	+	+	(1)	Viton seals. Naphthalene is a solid - check compatibility with solvent.
Nitrobenzene	$C_6H_5NO_2$				+		1	PFA encapsulated 'O' seals. (Viton could be used but some deterioration may be expected)
Niter cake								See Sodium bisulphate
Nitric Acid	HNO_3				+		(1)	TFOV only. (Special cocks could be used in TFOW filters at low concentrations)
Nitrogen	N_2	+		+	+	+	G2	TFOV or Y-type filters only.
O								
Oils, Essential		+	+	+	+	+	(1)	Check 'O' seal compatibility with specific oil and possible solvent. Generally SS preferred.
Oils, Mineral		+	+	+	+	+	(1)	Also see gasoline & diesel oil. Possible problems with 'waxing' at high viscosities and low temperatures.
								Possibility of hydrogen sulphide stress cracking in crude oils with steel (See NACE MR 0175)

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX®
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
Oils, Vegetable & Animal		+	+	+	+	+	(1)	Generally EP 'O' seals are not compatible. Do not use Nitrile with rapeseed or pine oil. SS usually preferred for perfumery and food products.
Oleic Acid					+		2	PFA encapsulated or Viton seals. Single or Y-Type filters only. Monel or Hastelloy elements.
Oleum								See Sulphuric acid.
Olive oil		+	+	+	+	+	2	Stainless steel usually preferred.
Oxalic Acid	HOOCCOOH.2HOH				+		(1)	Single or Y-Type filters only. Corrosion may be expected at high temps/concentrations. Monel baskets
Oxygen	O_2			+	+		G1	Viton 'O' rings. TFOV only. Special cleaning required prior to use. Only SS at elevated temperatures.
Ozone	O_3			+	+		G1	Viton 'O' rings. TFOV only. Special cleaning required prior to use
P								
Paint		+	+	+	+	+		Non-specific term. Includes water based and solvent based paint. See Notes 1 & 2 for water base paint. Confirm compatibility of 'O' seals with solvent base paints. Agitation (or Rotor blade scf) may be ideal.
Palm oil		+	+	+	+	+	2	
Palmitic acid	$CH_3(CH_2)_{14}COOH$				+		2	Check 'O' seal compatibility with solvent.
Paraffin		+	+	+	+	+	(1)	
Paraffin Wax		+	+	+	+	+	2	
Peanut oil		+	+	+	+	+	2	Stainless steel usually preferred.
Pentane (n-pentane)	$CH_3(CH_2)_3CH_3$	+	+	+	+	+	1	
1-pentanol	$CH_3(CH_2)_4OH$							See Amyl alcohol
Petroleum Spirits (Petrol)								See 'Gasoline'
Phenol	C_6H_5OH				+		(1)	Viton 'O' rings.
Phosphoric Acid	H_3PO_4				+		(1)	Special cocks in dual filters. Some corrosion at high concentrations/temps. Monel baskets preferred.
Phthalic acid	$C_6H_4(COOH)_2$				+		2	Phthalic acid is a solid - confirm compatibility with solvent. Special cocks in dual filters.
Phthalic anhydride	$C_6H_4(CO)_2O$				+		2	Phthalic anhydride is a solid - confirm compatibility with solvent. Special cocks in Dual filters.
Picric Acid	$C_6H_2(NO_2)_3OH$				+		1	Do not use Dual filters.
Pine Gum & Oil					+		1(50)	CI & CS could be used. Viton 'O' seals preferred.
Pitch		+		+	+		2	Heating jacket usually required. High sulphur content may require NACE MR 0175 to prevent hydrogen sulphide stress cracking.
Polyol		+	+	+	+	+	(1)	
Potassium Alum	$AlK(SO_4)_2$				+		2	Dual filters only on low concentrations and with special cocks.
Potassium Bicarbonate	$KHCO_3$	+	+	+	+	+	2	See Note 1 & 2.
Potassium Carbonate	K_2CO_3	+		+	+		2	See Note 1 & 2.
Potassium Chlorate	$KClO_3$				+		(1)	See Note 1 & 2. Other materials could be used at low concentrations. Special cocks in Dual filters.
Potassium Chloride	KCl				+		2	Only suitable at low concentrations/ low temperatures.
Potassium Chromate	K_2CrO_4	+	+	+	+	+	(1)	See Note 1 & 2.
Potassium Cyanide	KCN	+		+	+		1	CI & CS for TFOV filters only. Special cocks in Dual filters.
Potassium Diphosphate	KH_2PO_4	+	+	+	+	+	2	
Potassium Ferricyanide	$K_3Fe(CN)_6$				+		2	

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
Potassium Hydroxide	KOH	+		+	+		2	EP 'O' rings. CI & CS TFOV to 7% max at 30°C max.. SS TFOW to 25% max. SS TFOV only at higher concentrations. Do not use anaerobic adhesives. See Note 1 & 2.
Potassium Permanganate	$KMnO_4$	+	+	+	+	+	(1)	See Note 1 & 2.
Potassium Phosphate	KH_2PO_4	+	+	+	+	+	2	
Potassium Sulphate	K_2SO_4	+	+	+	+	+	2	GM, CS, CI & WB suitable only at low temp. See Note 1 & 2. Special cocks required in dual filters.
Propane	C_3H_8	+		+	+	+	G1	TFOV or Y-Type filters only. (Liquifiable gas)
Propionic Acid	$CH_3CH_2CO_2H$				+		2	Nitrile seals
Propylene (Propene)	$CH_3CH:CH_2$	+		+	+	+	G1	Viton 'O' seals. TFOV or Y-Type only. (Liquifiable gas)
Propylene Glycol	$CH_3CHOHCH_2OH$	+	+	+	+	+	1(99)	
Propylene Oxide	CH_3CHCH_2O			+	+		1	EP 'O' rings
Prussic acid								See Hydrocyanic acid
Pyradine	$N(CH)_5$	+		+	+		1	EP 'O' seals.
Q								
Quicklime								(See calcium hydroxide)
R								
Rosin					+		2	Heating jacket usually required.
S								
Salt Peter								See Sodium nitrate
SBS								See Butyl alcohol
Sea Water		+	+	+	+	+	2	See "Water sea"
Sesame oil		+	+	+	+	+	2	Stainless steel usually preferred.
Sewage		+	+	+	+	+	2	See Note 1 & 2.
Shellac		+	+	+	+	+	1	
Silver Nitrate	$AgNO_3$				+		2	Single or Y-Type filters only. Elements may need regular replacement.
Soap Solutions		+	+	+	+	+	2	See Note 1 & 2.
Soda or Soda Ash								See Sodium carbonate
Soda nitre								See Sodium nitrate
Sodium acid sulphate								See sodium bisulphate.
Sodium Acetate	$NaC_2H_3O_2$				+	+	2	EP 'O' rings. Cast iron (including WB) can be used at medium to low concentrations.
Sodium Aluminate	$NaAlO_2$				+		2	Single or Y-Type filters only. Elements may need regular replacement.
Sodium Bicarbonate	$NaHCO_3$				+		2	Other materials could be used for single or Y-Type filters. (See notes 1 & 2)
Sodium Bisulphate	$NaHSO_4$				+		2	Special cocks required in Dual filters.
Sodium Bisulphite	$NaHSO_3$				+		2	
Sodium Borate	$Na_2B_4O_7$							See Borax
Sodium Bromide	NaBr				+		1	
Sodium Carbonate	Na_2CO_3	+		+	+		2	Use stainless steel filters above 10% solution. See Note 1 & 2.
Sodium Chlorate	$NaClO_3$				+		(1)	Single or Y-Type filters only.

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
Sodium Chloride	NaCl				+	+	2	GM may suffer corrosion at high temp./ high concentrations. Use special cocks in TFOW filters at high concentrations. See 'water - sea' for lower concentrations.
Sodium Chromate	Na_2CrO_4				+		(1)	Special cocks in Dual filters.
Sodium Cyanide	NaCN	+		+	+		1	CI & CS for TFOV filters only. Special cocks in TFOW filters. See Note 1 & 2.
Sodium Fluoride	NaF				+		(1)	
Sodium hydrogen sulphate								See sodium bisulphate.
Sodium Hydroxide	NaOH	+		+	+		2	EP 'O' rings. CI & CS for TFOV to 7% / 30°C only (some corrosion will occur). SS TFOW to 25% max. SS TFOV only at higher concentrations. Do not use anaerobic adhesives. See Note 1 & 2.
Sodium Hypochlorite	NaOCl				+		(1)	Y-Type or single filters only. (Some deterioration expected) Rapid basket deterioration except in weak solutions.
Sodium Metaphosphate	$(NaPO_3)n$				+		2	
Sodium Nitrate	$NaNO_3$	+	+	+	+	+	2	EP or V 'O' seals. CI & CS for TFOV only. WB & GM at low concentrations only. See Note 1 & 2.
Sodium Phosphate	Na_2HPO_4				+		2	
Sodium Polyphosphate					+		2	
Sodium Silicate	$Na_2O.nSiO_2$	+		+	+		2	See Note 1 & 2.
Sodium Sulphate	Na_2SO_4	+		+	+		2	See Note 1 & 2.
Sodium Sulphide	Na2S	+		+	+		2	Do not use Dual filters. CI & CS for TFOV & Y-Type filters only. See note 2.
Sodium Sulphite	Na_2SO_3	+		+	+		2	Do not use Dual filters. CI & CS for TFOV & Y-Type filters only. See note 2.
Sodium Tetraborate								See Borax
Sodium Thiosulphate	$Na_2S_2O_3$				+		2	
Sodium Triphosphate	$Na_5P_3O_{10}$				+			See sodium polyphosphate.
Soybean Oil		+	+	+	+	+	2	
Starch		+	+	+	+	+	2	See Note 1 & 2. Starch solutions can be dilatent at high concentrations. Scf may suffer element blockage.
Steam	H_2O	+		+	+	+	2	EP 'O' rings. Do not use TFOW filters (or scf) See Note 2. Scf with caution.
Stearic Acid	$CH_3(CH_2)_{16}COOH$				+		2	Encapsulated 'O' seals. Do not use dual filters. Check compatibility with solvent.
STFF								See sodium polyphosphate.
Styrene (monomer)		+	+	+	+	+	1	Encapsulated 'O' seals (Viton can be used with some swelling)
Sugar Liquids		+	+	+	+	+	2	SS preferred. See Note 1 & 2.
Sulphur Chloride	S_2Cl_2				+		(1)	Viton 'O' rings. TFOV or Y-Type only (0.1mm/yr erosion) Perf baskets only.
Sulphur Dioxide (Dry)	SO_2	+		+	+	+	G1	TFOV or Y-Type filters only.
Sulphur Dioxide Liquid (Dry)	SO2	+		+	+	+	G1	Dual filters not recommended.
Sulphur Dioxide (Wet)	$SO_2 + H_2O = H_2SO_3$						G1	See sulphurous acid.
Sulphuric Acid >95%	H_2SO_4	+			+		1	Viton 'O' rings. None of TopFilter's standard materials are compatible with concentrations below 95%
Sulphurous Acid	H_2SO_3				+		(1)	Nothing suitable above 10% conc
T								
Tallow		+		+	+		2	EP 'O' rings preferred. Stainless steel filters usually preferred for food grade tallow.
Tannic Acid	$C_{76}H_{52}O_{46}$				+	+	(1)	Special cocks required in stainless steel dual filters.

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX®
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		
Tannin					+	+	(1)	Special cocks required in stainless steel dual filters.
Tar		+	+	+	+	+	(1)	May need heating jackets to reduce viscosity. May require NACE MR 0175 to prevent H_2S stress cracking.
Tartaric Acid	$HOOC(CHOH)_2COOH$				+	+	2	Nitrile or Viton 'O' rings. Special cocks required in dual filters.
Titanium Dioxide	TiO_2	+	+	+	+	+	2	A slurry - possible jamming problems with dual filters. Possible precipitation problems.
Toluene	$C_6H_5CH_3$	+	+	+	+	+	1	Viton 'O' rings
Trichloroethylene	$CHCl:CCl_2$	+	+	+	+	+	1	Viton 'O' rings.
Trichloroacetic Acid (TCA)	CCl_3COOH						(1)	Stainless steel OV & Y-type filters with perforated elements could be used, but will deteriorate with time.
								Viton or EP seals.
Tung oil								See China Wood Oil
Turpentine (oil or gum)	C10H16	+	+	+	+	+	1	(Not EP 'O' rings)
U								
Urea	$CO(NH_2)_2$				+		2	Special cocks required in TFOWSS filters.
V								
Vinegar (~ 8% acetic acid)	$CH_3COOH(aq)$				+		2	EP or Viton 'O' rings. Special cocks in dual filters. Check sterilisation requirements.
Vinyl Acetate	$CH_3COOCH:CH_2$				+		1	EP or encapsulated 'O' rings. Steel TFOV & Y-Types could be used.
Vinyl Cyanide	$CH_3COOCH:CH_3$	+		+	+			See Acrylonitrile
W								
Water Distilled	H_2O				+	+	2	Fluid velocity should be less than 3 m/sec for GM filters. SS or GM usually preferred for distilled water. CI & CS TFOV filters, scf and WB dual filters can be used, but corrosion will occur. Increased corrosion rates in sea water. See Note 1 & 2. EP seals preferred above 100°C.
Water Fresh	H_2O	+	+	+	+	+		
Water Sea	H_2O + typically 3.5%NaCl	+	+	+	+	+		
Whey					+		2	Could use WB or GM (or CI or CS for TFOV or scf) but SS usually preferred. Check sterilisation requirements.
Whisky					+	+	2	SS preferred. See Note 1 & 2.
White liquor					+		2	
White Spirit		+	+	+	+	+	1	(Do not use EP seals)
Wine					+	+	2	SS usually preferred, but CI, CS or WB may be used (See notes 1 & 2) Also check sterilisation requirements.
Wood alcohol								See Methyl alcohol
X								
Xylene	$C_6H_4(CH_3)_2$	+	+	+	+	+	1	Viton 'O' rings
Xylol							1	Commercial grade xylene - see xylene.
Y								
Yeast		+	+	+	+	+	2	EP 'O' rings preferred. The copper based alloys in WB and GM filters may act as biocides. CI (for TFOV only) and WB filters will corrode in water base solutions. See Note 1 & 2. SS usually preferred.
Z								
Zinc Chloride	$ZnCl_2$				+		2	Do not use TFOW filters. Use monel elements. Some attack may be expected at high temperatures.
Zinc Sulphate	ZnSO4				+		2	Some attack possible at high temperatures. CI or CS could be considered for 'room' temperature applications. See notes 1 & 2. Cautious use of dual filters. Special cocks required in SS dual filters.

+ = Suitable filter type. Always check remarks column. CI = Cast Iron; WB = Water body (Cast iron body with bronze internals); CS = Cast steel; SS = Stainless steel (316); GM = Gun metal (bronze)

SPX®
WHERE IDEAS MEET INDUSTRY

JOHNSON PUMP
AN SPX BRAND

Guide to TopFilter chemical compatibility

November 2001 DOC 23 Issue 1

The information in the following tables is a general guide to the compatibility of TopFilter with various fluids. Temperature, pressure, concentration, or contamination of the fluids may effect chemical compatibility and the choice of filter. SPX will be pleased to offer advice wherever possible. It is incumbent on the end user to ensure that the filter is suitable for the fluid to be filtered and that appropriate precautions have been taken to protect the operator, other equipment and the environment. Where no reference is made to the type of elastomer used for 'O' seals, nitrile would be supplied in all instances except for stainless steel filters where Viton is the standard material.

Chemical name	Chemical Symbol	Body Material					Hazard	Remarks
		CI	WB	CS	SS	GM		

GENERAL NOTES

1 Do not used cast iron or cast steel dual filters on water based solutions (Cock seizure will occur as a result of corrosion)

2 Some corrosion will occur if cast iron or steel filters are used on water based solutions. This corrosion may weaken the filter over time and corrosion products may contaminate the filtrate.

3 Cast iron filters should be used with extreme caution below 0°C & above 100°C.

4 Do not use steel filters below -20°C unless special low temperature steel has been specified.

5 Water body (WB) dual filters should not be used above 150°C (or below 0°C).

6 The temperature limitations for 'O' seals are:-
Nitrile (NBR) -30°C to +120°C
Viton (fluorocarbon): -20°C to +200°C {Viton is a DuPont trade mark}
EP (EPDM): -50°C to +150°C
PFA encapsulated Viton: -20°C to +200°C
PFA encapsulated silicon: -55°C to +260°C

Notes: 1) PFA encapsulated seals should only be specified if absolutely necessary!
2) Some chemicals may further restrict the operating temperature range of the seal material - check with a seal manufacturer if in doubt.

7 A 'use special cocks' comment implies the use of hardened stainless steel cocks (or GM cocks, if appropriate) in stainless steel TFOW filters in place of Ni/PTFE coated cocks.

8 Mixtures of chemicals may react more aggressively than the individual constituents.

9 If there is any doubt about filter material selection, the user should consider conducting compatibility trials before installing the filter.

10 The computer based version of this chart contains data on each chemical accessible by 'hovering' the cursor over the chemical name.

11 The "Hazard" column indicates the hazard category in accordance with the European Pressure Directive 97/23/EC. The categories are:- Category 1 = Hazardous; Sub-category (1) = Hazardous depending on composition or concentration - discuss with your Supplier: Sub-category 1(xx) = Hazardous (flammable) above the temperature xx°C (flashpiont); Category 2 = Non-hazardous. The prefix 'G' indicates that the chemical is gaseous at normal room temperature and pressure (even though it may be being filtered as a liquid).